REMARKS

This Reply is responsive to the Office Action dated November 16, 2004. Entry of the amendments and remarks submitted herein and reconsideration of the claimed subject matter pursuant to 37 CFR §1.112 is respectfully requested.

I. Status of the Claims

Claims 23-56 were pending in this application at the time of the Office Action dated November 16, 2004. Claims 35, 36, 40 and 44 were withdrawn from consideration. As a result of this amendment, claims 24, 27, 39, 43 and 49-55 have been canceled and new claims 57-65 have been added. Accordingly, claims 23, 25, 26, 28-34, 37, 38, 41, 42, 45-48 and 56-65 are now pending and under examination.

II. Amendments to the Specification and the Claims

In response to the objections to the specification and the drawings, Applicants submit herewith a substitute specification and replacement drawings as suggested in the Office Action. Neither the drawings nor the substitute specification includes any prohibited new matter. Pursuant to 37 CFR 1.125, Applicants have also submitted herewith a marked up version of the specification showing any changes from the specification as originally filed.

Claim 23 has been amended in several aspects to clarify the claim language. For instance, claim 23 has been amended to include the hybridization conditions disclosed in the substitute specification at page 5, lines 1-11. In addition, claim 23 has been amended to replace

reference to derivatives with reference to nucleic acids having at least 40% identity to the recited amino acid sequences. Support for this amendment may be found in the substitute specification at page 5, line 30, and page 6, lines 8-11. The proviso excluding SEQ ID Nos. 3 to 5 from claim 23 has been deleted. The sequences from this proviso, as well as those recited in claims 24 and 50, have been added to claim 23. Accordingly, claims 24, 49 (which was dependent on claim 24) and 50 have been canceled. Reference to fragments has been deleted, and claim 26 has been amended to indicate that the claimed fragments are at least ten nucleotides. Claim 23 has also been amended to indicate that the cells deficient in nuclear base transporter activity are yeast cells. Support for this amendment may be found in the substitute specification at page 4, lines 8-9.

All independent claims with the same claim structure as claim 23 have been amended to depend on claim 23. In addition, the dependent claims have been amended to refer to the appropriate previous claim. Claim 26 has been amended to incorporate the limitation of claim 27. Accordingly, claim 27 has been canceled. Reference to a host cell has been deleted from claims 33 and 34. All pending use claims have been reworded as method claims.

Finally, claims 39, 43 and 49-55 have been canceled and new claims 57-65 have been added. Claim 57 finds support in original claim 1, section (f). Claims 58 and 59 are directed to a plant cell and a plant, respectively, produced by the process of claim 38. Claim 60 is directed to a method of regenerating a plant comprising growing a plant from the plant cell of claim 58. This claim finds support in original claim 17. Claim 61 recites that the yeast cell of claim 23 is deficient in *fcy2* expression. Support for this claim may be found in the substitute specification at page 4, lines 13-14. Claim 62 recites that the nuclear base transporter transports at least one

compound selected from the group consisting of nuclear bases, nucleosides, cytokinines and alkaloids. Support for this claim may be found in the substitute specification at page 3, lines 6-19. Claim 63 defines the nuclear bases as being selected from the group consisting of adenine, cytosine and hypoxanthine. Claim 64 defines the nucleoside as being selected from the group consisting of adenosine and cytidine. Claim 65 defines the cytokinine as being selected from the group consisting of zeatine and kinetine. Support for claims 63-65 may be found in the substitute specification at the very least in Example 2 and Figures 3 and 5.

No prohibited new matter has been added by way of any of amendment submitted herein.

III. Elections/Restrictions

Applicants acknowledge with appreciation the Examiner's decision to consider SEQ ID Nos. 2, 6-7 and 10 along with SEQ ID No. 1. In addition, the Examiner has also considered SEQ ID Nos. 3-5, given the indication on page 14 of the Office Action that these sequences are free of the prior art.

IV. Objections to the Specification

The specification was objected to for lacking page and paragraph numbering. Also, at page 7 of the specification, the amino acid sequence SEQ ID No. 9 is referred to as a nucleic acid. Applicants have submitted herewith a substitute specification that includes page numbers and corrects the references to the sequences on page 10. In addition, since paragraph numbering is only optional pursuant to 37 CFR §1.52(b)(6), Applicants have included line numbering in the substitute specification. A marked up version of the substitute specification generated with

Deltaview showing the changes as compared to the originally filed specification is also submitted herewith. Withdrawal of the objections to the specification is respectfully requested.

V. Objections to the Drawings

The drawings were objected to for including German language rather than English. Accordingly, replacement drawings are submitted herewith. Withdrawal of the objection to the drawings is respectfully requested.

VI. Rejections Under 35 U.S.C. §112

Claims 23-34, 37-39, 41-43 and 45-56 were rejected under 35 U.S.C. §112, second paragraph for alleged indefiniteness. The separate grounds for the rejection will be addressed in the order presented in the Office Action.

"obtainable"

Claims 23, 26, 31, 33, 37-39 and 41-43 were rejected for including the word "obtainable." Without agreeing with the rejection, Applicants note that the word "obtainable" is not included in the amended claims. Therefore, this ground for the rejection is now moot.

"nuclear base transporter"

Claims 23, 26, 31, 33, 37-39 and 41-43 were rejected for including the phrase "nuclear base transporter." According to the Office Action, the definition on page 2 of the specification encompasses various proteins involved in transport and it is allegedly unclear what transporters

are encompassed by the claims. Applicants respectfully disagree and note that the term is appropriately defined in the specification as including a protein which takes part in the transport of nuclear bases and substances chemically related thereto as listed and exemplified in the originally filed specification at page 2. Given that a definition is provided, and many examples are provided, the meaning of the term is clear from the specification. Reconsideration and withdrawal of this ground for the rejection are respectfully requested.

"derivative"

Claims 23, 26, 31, 33, 37-39 and 41-43 were rejected for including the word "derivative." Without agreeing with the rejection, Applicants note that the word "derivative" is not included in the amended claims. Therefore, this ground for the rejection is now moot.

"complementary"

Claims 23, 26, 31, 33, 37-39 and 41-43 were rejected for including reference to the complementary strand, since the complementary strand does not encode for a protein. Without agreeing with the rejection, Applicants note that reference to the complementary strand has been canceled from claim 23, and instead presented in new claim 57. Therefore, this ground for the rejection is now moot.

"plant or animal gene bank"

Claims 23, 26, 31, 33, 37-39 and 41-43 were rejected for including the phrase "plant or animal gene bank." Without agreeing with the rejection, Applicants note that the phrase "plant

or animal gene bank" is not included in the amended claims. Therefore, this ground for the rejection is now moot.

"construct antisense to the regulatory sequence"

Claim 29 was rejected because it is unclear how a construct can be antisense to the regulatory sequence. Claim 29 has been amended to clarify that the nucleic acid is expressed from the regulatory sequence in the antisense orientation. Therefore, this ground for the rejection is now moot.

"construct available in a plasmid"

Claims 30 and 48 were rejected because it is unclear how a construct can be available in a plasmid. Claims 30 and 48 have been amended to clarify that the construct is a plasmid. Therefore, this ground for the rejection is now moot.

"host cell"

Claims 33 and 54-56 were rejected for including an improper Markush group. Specifically, the examiner suggested that reference to a host cell be deleted from these claims. Applicants fail to see how reference to a "host cell" forms an improper Markush group, but have nevertheless deleted reference to a host cell from claims 33, dependent claim 34 and claim 56 since host cells containing the claimed nucleic acids are already covered by claims 31 and 32. In addition, claims 54 and 55 have been canceled. Therefore, this ground for the rejection is now moot.

"manufacturing of plants"

Claims 37, 39 and 43 were rejected because plants are allegedly produced, not manufactured. Without agreeing with the rejection, Applicants note that the term "manufacturing" is not included in amended claim 37, and claims 39 and 43 have been canceled. Therefore, this ground for the rejection is now moot.

positive process steps

Claims 39 and 41-43 were rejected for failing to include positive steps. Claims 39 and 43 have been canceled, and claims 41 and 42 have been amended to include positive process steps. Therefore, this ground for the rejection is now moot.

further comprising SEQ ID Nos. 3-5

Claim 51 was rejected because it is unclear how a host cell that does not comprise SEQ ID NO: 3, 4 or 5 can further comprise the same sequence. Without agreeing with the rejection, Applicants have canceled claim 51. Therefore, this ground for the rejection is now moot. Further, Applicants note that the proviso excluding SEQ ID Nos. 3-5 from claim 23 has been deleted in view of the Examiner's indication on page 14 of the Office Action that these sequences are free of the prior art, and these sequences are now included as part of the invention recited in claim 23.

"a recited nucleic acid"

Claims 52-53 were rejected for including the phrase "a recited nucleic acid." Without agreeing with the rejection, Applicants note that these claims have been canceled. Therefore, this ground for the rejection is now moot.

"further comprises a construct"

Claim 56 was rejected for including the phrase "further comprises a construct." Without agreeing with the rejection, Applicants note that the rejected phrase is not included in the amended claim. Therefore, this ground for the rejection is now moot.

VII. Rejection under 35 U.S.C. §101

Claims 39 and 41-43 were rejected under 35 U.S.C. §101 for reciting a use rather than a method. Claims 39 and 43 have been canceled, and claims 41 and 42 have been amended to refer to a method rather than a use, and to include positive process steps. Therefore, this rejection is now moot.

VIII. Enablement Rejection under 35 U.S.C. §112

Claims 23-34, 37-39, 41-43 and 45-56 were rejected under 35 U.S.C. §112, first paragraph because the specification, while being enabled for an isolated nucleic acid encoding SEQ ID No. 8, host cells/plants/plant parts/seeds comprising the same and methods for transforming a plant with the same, allegedly fails to provide enablement for a nucleic acid sequence encoding a plant or animal nuclear base transporter in general or fragments thereof. In particular, the Examiner asserts that Applicant does not provide any guidance for the obtention

and use of nucleic acids other than SEQ ID No. 1 by complementation, and that the specification is silent regarding the functional activity of the other sequences disclosed in the specification. The Examiner points to Chen et al., which discloses a putative plant amino acid transporter that failed to complement a yeast amino acid transporter, and Newman et al., which discloses a fragment of SEQ ID NO: 1 with no known transport activity as being evidence of the state of the art. Further, the Examiner asserts that no guidance has been provided for regions in SEQ ID No. 1 that would tolerate modifications. Applicants respectfully traverse the rejection.

At the outset, Applicants note that claim 23 has been amended to refer to a nucleic acid that is obtained through complementation of yeast nuclear base transporter-deficient host cells. New claim 61 indicates that the yeast cell is deficient in *fcy2* expression. Claim 23 has also been amended to include specific hybridization conditions and a specific minimum level of identity as compared to the nucleic acids SEQ ID Nos. 8 and 9. Claim 23 has also been amended to delete reference to fragments, and claim 26 as amended only refers to fragments of the sequences that are specifically disclosed.

In response to the Examiner's assertion that Applicants have only identified by complementation one nuclear base transporter gene, Applicants respectfully note that claim 23 as amended is not limited solely to nuclear base genes identified by complementation but includes sequences that have a minimum level of identity with the disclosed sequences, sequences that hybridize with the disclosed sequences under stringent hybridization conditions, and recites the specific sequences disclosed in the specification. Thus, Applicants disclose the sequence of several nuclear base transporter nucleic acids meeting the limitations of claim 23. The nucleic acid having SEQ ID NO: 1 was isolated by complementation in yeast nuclear base transporter-

deficient host cells. The other nucleic acids disclosed in the sequence listing and recited in the claims were identified by homology analysis and would predictably have properties similar to the nucleic acid having the sequence SEQ ID NO: 1. Thus, Applicants disclose at least eight different plant nuclear base transporter sequences.

The Examiner's reliance on Chen et al. appears to be misplaced, since Chen discloses the complementation of an amino acid transporter gene rather than a nuclear base transporter gene. The fact that Chen et al. were unable to complement an amino acid transporter gene has no bearing on enablement of the present invention, particularly since Applicants have demonstrated that plant nuclear base transporters may be obtained in yeast by complementation through the identification of SEQ ID NO: 1.

The Newman et al. reference also has no relevance in view of the amended claims. Specifically, amended claim 23 no longer refers to functional fragments of the claimed nucleic acids. Further, amended claim 26, which is directed to fragments of the claimed nucleic acids that are at least ten nucleotides long, does not require that the fragments encode a functional nuclear base transporter, and is specifically directed to fragments of the particular sequences disclosed in the specification. Thus, it is irrelevant to enablement of the claimed invention that Newman discloses a fragment of SEQ ID No. 1 having no base transport activity.

The Examiner has also asserted that no guidance is provided for regions in SEQ ID No. 1 that could be modified and still provide for a functional nuclear base transporter as recited in claim 23. Applicants respectfully submit that specific positions amenable to modification need not be disclosed when Applicants have disclosed an assay that may be readily used to select and identify active mutants. It would be well within the capabilities of one of ordinary skill in the art

to conduct random or site-directed mutagenesis on the sequences disclosed in the specification, and transform such randomly mutated sequences into the disclosed mutant yeast strain to identify sequences that are able to complement *fcy2* activity.

Further, in contrast to what is asserted in the Office Action, it was entirely routine at the time the application was filed to make multiple random or site-directed mutations in a single gene and screen the gene for activity. It is irrelevant that one might expect the tolerance to modification to diminish with each additional modification when one has the power of selection via complementation as disclosed in the specification. Multiple mutations resulting in a nonfunctional protein would not be selected by the assay, and are therefore not included in claim 23. A considerable amount of experimentation is permissible for enablement purposes, if it is merely routine, or if the specification provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed. *In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988).

In view of the amendments and remarks above, reconsideration and withdrawal of the rejection for scope of enablement under 35 U.S.C. §112, first paragraph, are respectfully requested.

IX. Written Description Rejection under 35 U.S.C. §112

Claims 23-34, 37-39, 41-43, 45-50, 52-53 and 55-56 were rejected under 35 U.S.C. §112, first paragraph, for allegedly containing subject matter that is not described in the specification so as to convey that Applicants had possession of the claimed invention. In particular, the Examiner asserts that the present claims are genus claims, whereas Applicants have only

allegedly disclosed one nucleic acid (SEQ ID No. 1) and one amino acid acid sequence (SEQ ID No. 8). The examiner stresses the multitude of nucleic acids that would hybridize to the claimed sequences, and the multitude of variants and fragments that would be encompassed by the claims. Applicants respectfully traverse the rejection.

At the outset, as mentioned above, Applicants note that claim 23 has been amended to refer to a nucleic acid that is obtained through complementation of yeast nuclear base transporter-deficient host cells. New claim 61 indicates that the yeast cell is deficient in *fcy2* expression. Claim 23 has also been amended to include specific hybridization conditions and a specific minimum level of identity as compared to the nucleic acids SEQ ID Nos. 8 and 9. Claim 23 has also been amended to delete reference to fragments, and claim 26 as amended only refers to fragments of the sequences that are specifically disclosed.

In contrast to what is asserted in the Office Action, Applicants disclose the sequence of several nuclear base transporter nucleic acids. As noted above, nucleic acids SEQ ID Nos 2, 3, 4, 5, 6, 7 and 10 were identified by homology analysis and would predictably possess similar properties as SEQ ID No. 1. Thus, Applicants disclose at least eight different plant nuclear base transporter sequences, which is enough to support a genus claim.

In view of the amendments above, and the disclosure of at least eight different plant nuclear base transporter sequences, Applicants respectfully submit that the claimed genus is reasonably supported by the disclosure. Reconsideration and withdrawal of the rejection for lack of written description under 35 U.S.C. §112, first paragraph, are respectfully requested.

X. Rejection under 35 U.S.C. §102

Claims 23-34, 37-39, 41-43, 45-50, 52-53 and 55-56 were rejected under 35 U.S.C. §102(b) as being allegedly anticipated by Frommer et al. (US 5,719,043). According to the Office Action, Frommer et al. teach isolated nucleic acids from Arabidopsis encoding an amino acid transporter by complementation in yeast cells. The Examiner refers to the previous rejection under §112, second paragraph, apparently indicating that because the term "nuclear base transporter" has been considered to be indefinite, it has been construed as reading on an amino acid transporter. Applicants respectfully traverse the rejection.

At no point in the application is the term nuclear base transporter defined as a protein that transports amino acids. The nuclear base transporters of the present invention transport nuclear bases, nucleosides, alkaloids and cytokinines, which are all compounds with structural similarity as disclosed at page 3, lines 6-19 of the substitute specificifaction. The definition of a nuclear base transporter has been provided by reference to structurally similar classes of compounds and this definition does not include amino acids. Accordingly, Applicants respectfully submit that Frommer '043 can not be applied as prior art against the claimed invention.

Reconsideration and withdrawal of the rejection under 35 U.S.C. §102(b) are respectfully requested.

This reply is fully responsive to the Office Action dated November 16, 2004. Therefore, a Notice of Allowance is next in order and is respectfully requested.

Except for issue fees payable under 37 CFR §1.18, the commissioner is hereby authorized by this paper to charge any additional fees during the pendency of this application including fees due under 37 CFR §1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account 50-0310. This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR EXTENSION OF TIME** in accordance with 37 CFR §1.136(a)(3).

If the Examiner has any further questions relating to this Reply or to the application in general, she is respectfully requested to contact the undersigned by telephone so that allowance of the present application may be expedited.

Respectfully submitted,

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